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| 10/566,116 | 01/24/2006 | Akihisa Inoue | OGOSH44USA | 3700 |
| 270 7590 01/29/2011 HOWSON & HOWSON LLP 501 OFFICE CENTER DRIVE SUITE 210 FORT WASHINGTON, PA 19034 | | | | |
| EXAMINER ZHU, WEIPING | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1734 | | | | |
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| 01/20/2011 | | ELECTRONIC | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary

Application No.

10/566,116

Applicant(s)

INOUE ET AL.

Examiner

WEIPING ZHU

Art Unit

1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 September 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2, 3, 14, 20 and 37-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2, 3, 14, 20 and 37-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 20, 2010 has been entered.

Status of Claims

2. Claims 2, 3, 14, 20 and 37-44 are currently under examination wherein claims 2 and 37 have been amended in applicant's amendment filed on September 20, 2010.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2, 3, 14, 20, 37, 38 and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. ("Deformation Behavior of Zr-Based Bulk Nanocrystalline Amorphous Alloys", Physical Review B, volume 61, number 6, R3761-R3763, February 1, 2000-II) in view of Nate et al. (US 4,992,059).

With respect to claims 2, 3, 14, 20, 37 and 38, Fan et al. discloses (abstract) a Zr-based bulk nanocrystalline amorphous alloy $Zr_{53}Ti_5Ni_{10}Cu_{20}Al_{12}$ having an average

grain size range of 2.0-2.5 nm being uniform entirely throughout the specimen (Fan et al., the paragraph bridging the left and right columns and Fig. 2, page R3762), which overlaps the claimed ranges in the instant claim 2, 3, 37 and 38; having a three or more component system and more than 50 at% of Zr as claimed in the instant claims 2 and 37; and having at least one element selected from a group consisting of Cu, Ni and Al as claimed in the instant claims 14, 20 and 37. The Zr-based bulk nanocrystalline amorphous alloy of Fan et al. is a bulk amorphous metallic glass satisfying the requirements of atomic radius difference and negative heat of mixing as claimed in the instant claims 2 and 37.

With respect to claims 2 and 37, Fan et al. does not teach producing a sputtering target from the bulk amorphous metallic glass.

Nate et al. ('095) discloses amorphous materials can be formed into sputtering targets by sintering powders of desired compositions (col. 1, lines 18-35 and col. 2, line 31 - col. 4, line 68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the bulk metallic glass material produced in the process of Fan et al. into a sputtering target by sintering the bulk metallic glass material in powder form as disclosed by Nate et al. ('095) in order to deposit on a substrate a thin film of desired composition and structure as disclosed by Nate et al. ('095) (col. 1, lines 25-28).

With respect to claims 2 and 37, Nate et al. ('095) discloses that the diameter of the sputtering target is 151 mm (col. 5, lines 35-43), which is within the claimed range. A prima facie case of obviousness exists. See MPEP 2144.05 I.

With respect to claims 2 and 37, Fan et al. in view of Nate et al. ('095) does not disclose the sputtering target being made of sintered gas-atomized powder as claimed. However, "being made of sintered gas-atomized powder" is a process limitation in a product claim. Even though product claims are limited by and defined by the process, determination of patentability is based on the product itself. Fan et al. in view of Nate et al. ('095) disclose a sputtering target comprising an amorphous metallic glass, which reasonably appear to be only slightly different than the claimed metallic glass in the instant claims 2 and 37 as discussed above. A rejection based on section 103 of the status is eminently fair and acceptable. See MPEP 2113.

With respect to claims 2 and 37, Fan et al. in view of Nate et al. ('095) does not specify the density of the sputtering target. However, it has been well held where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977), MPEP 2112.01 [R-3] I. In the instant case, the claimed and Fan et al. in view of Nate et al. ('095)'s sputtering targets are identical or substantially identical in structure or composition and are produced by identical or substantially identical processes as discussed above, therefore a prima facie case of obviousness exists. The same density as claimed in the instant claims 2 and 37 would be expected in the sputtering target of Fan et al. in view of Nate et al. ('095) as in the claimed sputtering target.

With respect to the amended features in claims 2 and 37, Fan et al. discloses (abstract) a Zr-based bulk nanocrystalline amorphous alloys comprising fine crystals having an average grain size range of 2.0-2.5 nm being uniform entirely throughout the amorphous matrix (paragraph bridging the left and right columns and Fig. 2, page R3762). The average grain size of the fine crystals disclosed by Fan et al. overlaps the instantly claimed average crystallite size. The fine crystals or fine crystal grains disclosed by Fan et al. appear to be the same as the instantly claimed crystallites because crystallites are often referred by metallurgists as grains. The Zr-based bulk nanocrystalline amorphous alloy of Fan et al. is completely amorphous with uniformly dispersed fine crystal grains (paragraph bridging the left and right columns and Fig. 2, page R3762), which meet all the limitations of the entire amorphous structure with uniformly dispersed crystallites as claimed in the instant claims 2 and 37. Therefore, grain boundaries would not be observable and there would be no crystal growth in the sputtering target of Fan et al. in view of Nate et al. ('095) as in the instantly claimed sputtering target.

With respect to claim 42, the Ni, Cu and Al contents in the sintered body target structure of a Zr-based bulk nanocrystalline amorphous alloy $Zr_{53}Ti_5Ni_{10}Cu_{20}Al_{12}$ of Fan et al. in view of Nate et al. ('095) are 5 at.% or more.

With respect to claim 43, the sintering temperature limitation is a process limitation in a product claim. Even through product claims are limited by and defined by the process, determination of patentability is based on the product itself. Fan et al. disclose an amorphous metallic glass (abstract), which reasonably appear to be only

slightly different than the claimed metallic glass in the instant claim 37. A rejection based on section 103 of the status is eminently fair and acceptable. See MPEP 2113.

With respect to claims 44, Fan et al. in view of Nate et al. ('095) does not specify the claimed surface roughness of the metallic glass sputtering target after sputtering is performed. However, it has been well held where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977), MPEP 2112.01 [R-3] I. In the instant case, the claimed and Fan et al. in view of Nate et al. ('095)'s sputtering targets are identical or substantially identical in structure or composition and are produced by identical or substantially identical processes as discussed above, therefore a prima facie case of obviousness exists. The same roughness as claimed in the instant claim 44 would be expected in the sputtering target of Fan et al. in view of Nate et al. ('095) as in the claimed sputtering target.

4. Claims 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan et al. in view of Nate et al. ('095) as applied to claims 2 and 37 above and further in view of Kakiuchi et al. ("Application of Zr-Based Bulk Glassy Alloys to Golf Clubs", Materials Transactions, Vol. 4, No. 4 (2001) pp. 678 to 681).

With respect to claims 39 and 40, Fan et al. in view of Nate et al. ('095) does not disclose the claimed metallic glass. Kakiuchi et al. discloses that Zr-Al-Ni-Cu and Zr-Ti-Al-Ni-Cu metallic glassy alloys have been principle materials for basic research and application studies and that the metallic glassy alloys of $Zr_{60}Al_{10}Ni_{10}Cu_{20}$, which is close

to the claimed $\text{Zr}_{65}\text{Cu}_{17.5}\text{Ni}_{10}\text{Al}_{7.5}$, and $\text{Zr}_{58}\text{Ti}_2\text{Al}_{10}\text{Ni}_{10}\text{Cu}_{12}$, which is close to the $\text{Zr}_{53}\text{Ti}_5\text{Ni}_{10}\text{Cu}_{20}\text{Al}_{12}$ of Fan et al. in view of Nate et al. ('095), have similar properties (sections 1 and 2, pages 678 and 679). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the $\text{Zr}_{53}\text{Ti}_5\text{Ni}_{10}\text{Cu}_{20}\text{Al}_{12}$ of Fan et al. in view of Nate et al. ('095) with the claimed $\text{Zr}_{65}\text{Cu}_{17.5}\text{Ni}_{10}\text{Al}_{7.5}$ to form a sputtering target with an expectation of success, because these metallic glassy alloys are functionally equivalent as disclosed by Kakiuchi et al.. See MPEP 2144.06.

With respect to claim 41, Fan et al. in view of Nate et al. ('095) and further in view of Kakiuchi et al. discloses that the content of Zr in the sintered body target structure of a Zr-based bulk nanocrystalline amorphous alloy $\text{Zr}_{60}\text{Al}_{10}\text{Ni}_{10}\text{Cu}_{20}$ is 60 at.%, which is close to the claimed lowest content of 65 at.%.

Response to Arguments

5. The applicant's arguments filed on September 20, 2010 have been fully considered but they are not persuasive.

First, the applicant argues that the structures of the target body of the instant invention and the specimen of Fan et al. are clearly different and Fan et al. in view of Nate et al. ('095) does not teach the amended features in the instant claims 2 and 37. In response, see the reason for the rejection of the amended features above. The instantly claimed crystallites are the same as the fine crystal grains of Fan et al.. The completely amorphous nanocrystalline alloy having uniformly dispersed fine crystal grains as disclosed by Fan et al. clearly satisfies all the limitations of the entire amorphous

structure with uniformly dispersed crystallites as claimed in the instant claims 2 and 37 as discussed above.

Second, the applicant argues that Nate et al. ('095) discloses an amorphous alloy thin film, not a sputtering target structure of an amorphous state. In response, the examiner notes that Nate et al. ('095) discloses amorphous materials can be formed into sputtering targets by sintering powders of desired compositions (col. 1, lines 18-35 and col. 2, line 31 - col. 4, line 68), which is the only teaching relied upon to establish the rejection ground of the claimed limitation of a sintered target structure of an amorphous state. The ground of rejection of the claimed composition and structure of the alloy rely on the teachings of Fan et al. rather than the teachings of Nate et al. ('095).

Third, the applicant argues that the rejection of claim 44 solely on the basis of the material of Fan et al. in view of Nate et al. ('095) being identical is improper because the materials, more particularly the microstructures, are not the same. In response, see the examiner's responses to applicant's arguments above.

Fourth, the applicant argues that the instantly claimed microstructure can provide unexpected results in terms of the small surface roughness remaining after sputtering. In response, see the reason for the rejection of the roughness feature as claimed in the instant claim 44 and the examiner's responses to applicant's arguments above.

Conclusions

6. This Office action is made non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose

telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached on 571-272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Weiping Zhu/
Examiner, Art Unit 1734

1/12/2011